Amendments to the Specification:

Please amend paragraphs **[0002]**, **[0008]**, **[0009]**, **[0011]**, **[0018]**, **[0019]** as follows:

[0002] The present invention relates to a high electron mobility transistor (HEMT). More particularly, the present invention relates to a HEMT formed as a field effect transistor (FET) having a gate insulating layer positioned between a gate [[electrode]] contact and channel layer. The invention also pertains to manufacturing methods for the aforementioned HEMT device.

[0008] Accordingly, in view of the above background, the present invention is directed to a ZnO-type FET which obtains large input amplitude by using a chemically stable gate insulating [[film]] layer. The invention is also directed to methods for manufacturing such FET device.

[0009] According to one embodiment of the present invention, there is provided a FET comprising a channel layer composed of ZnO grown homoepitaxially on a semi-insulating ZnO substrate. A gate [[electrode]] contact is disposed on the channel layer. A gate insulating [[film]] layer is disposed between the gate [[electrode]] contact and the channel layer and is composed of a Group-III nitride compound semiconductor containing at least aluminum as a Group-III element. Therefore, the present invention can provide a high electron mobility transistor (HEMT) that takes advantage of the electronic properties of Group III nitrides, and that does so in a manner superior to other existing and related devices.

[0011] According to the manufacturing method for the above FET, after the gate-insulating-film forming layer is formed on the channel layer, a dummy gate is formed, and the side walls are made on the lateral surfaces of the dummy gate. The gate-insulating-film-forming layer is then selectively removed by using the dummy gate and the sidewalls as a mask, thereby forming a gate insulating [[film]] layer.

17
JFM 5/31/06 **[00~~11~~]** Figure 1 illustrates the configuration of the HEMT according to the first embodiment of

the present invention. In this HEMT, a channel layer 2 and a gate insulating [[film]] layer 3 are sequentially laminated on a ZnO substrate (for example, a c-surface substrate). Formed on the gate insulating film 3 are a source electrode 4, which is electrically connected to the channel layer 2 via an opening of the gate insulating [[film]] layer 3. Further, a gate electrode 6 is disposed on the gate insulating [[film]] layer 3 having side walls 8. The source [[electrode]] contact 4, the drain [[electrode]] contact 5, and the gate [[electrode]] contact 6 are formed by sequentially laminating from the upper surface of the substrate 1. The substrate is formed from high resistance insulating ZnO. The channel layer [[3]] 2 is made from n-type ZnO doped with an n-type impurity, such as gallium, and has a thickness, for example, [[0.1.]] 0.1 micrometer. The concentration of the n-type impurity is, for example, 10^{18} atoms per cubic centimeter (cm^3). The impurity concentration and thickness of channel layer can be controlled to adjust the gate threshold voltage. The gate insulating [[film]] layer is made from, for example, magnesium zinc oxide (MgZnO), and has a thickness of, for example, three (3) nanometers. The source, drain and gate contacts 4, 5, 6 are covered with a passivation layer 7 as shown in Figure 1. [[Figure 2]] Figures 2A and 2B illustrate[[s]] the band connecting states between MgZnO and ZnO.

[0018] The aluminum gallium nitride (AlGaN) insulation characteristics were previously reported (A. Bykhovski, [[J.Appl.PhysMoreover]] J. Appl. Phs.,77(4),1616(1995)). In this paper replacement of GaN by ZnO is suggested. Furthermore, ZnO has fundamental advantage such as (1) availability of native substrates; (2) wet chemical etching is possible; and (3) more resistance to radiation damage. Also, ZnO is easily doped n-type to a high conductivity, can be made semi-insulating, is easily produced in thin film form, and can be grown in high quality, bulk form for homoepitaxial substrates. Homoepitaxial ZnO films with 10^4 dislocations have already been realized. The mobility of ZnO is lower than GaN because the effective mass is higher, and optical phonon scattering parameter is larger. However, it is interesting that the theoretical saturation velocity v_s which is more important for HEMT devices is higher for ZnO. So the ZnO HEMT disclosed herein is more efficient than other existing devices because of the abovementioned advantages.